

AD-A076 840

ADJUTANT GENERAL'S OFFICE (ARMY) WASHINGTON DC F/G 5/9
STUDY OF THE LITERATURE ON CRITERIA: IV. SPECIFIC MEASURES SUGG--ETC (U)
1952

F/G 5/9
SUGG--ETC (U)

UNCLASSIFIED 1952 AGO-RESEARCH NOTES 52-7

NL

1 OF 1
AD
A076840

END
DATE
FILMED
8-80
DTIC

①

MASTER FILE
Office, Chief, Publications Br.
U.S. Army Personnel Research Office, OCRD

RESEARCH ~~MEMORANDUM~~ **NOTE** 52-7

For reference only
Please return in 241

AD A 076840

LEVEL II

DDC
RECEIVED
NOV 9 1979
E

DDC FILE COPY

THIS DOCUMENT IS BEST QUALITY PRACTICABLE.
THE COPY FURNISHED TO DDC CONTAINED A
SIGNIFICANT NUMBER OF PAGES WHICH DO NOT
REPRODUCE LEGIBLY.

This document has been approved
for public release and sale; its
distribution is unlimited.

79 11 07 165

Encl 3

DISCLAIMER NOTICE

**THIS DOCUMENT IS BEST QUALITY
PRACTICABLE. THE COPY FURNISHED
TO DDC CONTAINED A SIGNIFICANT
NUMBER OF PAGES WHICH DO NOT
REPRODUCE LEGIBLY.**

DISPOSITION FORM

For use of this form, see AR 340-15, the proponent agency is TAGCEN.

| | |
|----------------------------|---|
| REFERENCE OR OFFICE SYMBOL | SUBJECT |
| PERI-TP | Clearance and Transmittal of Reports to Defense Technical Information Center (DTIC) |

TO DDC-DAA-I
ATTN: H. A. Schrecengost

FROM Research Pubs Group, ARI

DATE 6 Nov 79

CMT 1
(Price/48913)

1. The reports listed on Inclosure 1 are approved for public release with unlimited distribution (95 numbered ARI Research Memorandums, 51-1 thru 52-82).
2. These are among the unrecorded ARI reports which you identified to us 22 June 1979 as not in your retrieval system. The accompanying box contains at least one copy of each report listed in Inclosure 1, for your retention and reproduction.
3. We will be sending more previously unrecorded ARI reports to you shortly.

Helen S. Price

HELEN S. PRICE
Research Publications
Group, ARI

1 incl
list of reports

Sources: (Army Research Institute for the Behavioral and Social Sciences).

| | |
|---------------------|--|
| Accession For | |
| NTIS GRA&I | <input checked="checked" type="checkbox"/> |
| DDC TAB | <input type="checkbox"/> |
| Unannounced | <input type="checkbox"/> |
| Justification | |
| By _____ | |
| Distribution/ _____ | |
| Availability Codes | |
| Dist | Availand/or special |
| A | 23 |

① AGO-RESEARCH NOTES 52-7

① 1952

Research Note

PJ 4904-04

TIL 53

RN 52-7

① 1952

STUDY OF THE LITERATURE ON CRITERIA:
IV. SPECIFIC MEASURES SUGGESTED FOR USE AS CRITERIA.

-A-

I. Problem

This report is the fourth in a series of reports summarizing the literature on criteria. The complete plan of research and a general introduction to the problem is presented in the first report, and in the Program Plan for PR 4904. Briefly, an attempt will be made to organize and summarize publications concerned directly with the problem of selecting and constructing criterion measures. There will be no effort to edit, interpret, or clarify the ideas. As in Report I, the Problem of Definition, the material for this report is presented in outline form. The intention is to indicate the various viewpoints or theories expressed and provide reference to the author (s) advocating each viewpoint. Viewpoints are, therefore, not generally detailed, since it is expected that those interested in a particular aspect of the problem will first be concerned with general coverage of the area, and will then desire to consult the original source for further details. Whenever a viewpoint has been taken by more than one author, all are listed.

II. Procedure-A description of the method used in gathering the material may be found in Report Number I of this series.

III. Summary of the Literature

This section will list the various measures which have been suggested in the literature for use as criteria. They will be broadly classified according to type of measure. That is, the specific measure will be classified into the following five broad categories: on-the-job records,

Study of the Literature on Criteria: I. The Problem of Definition.

003 650

✓B

status or achievement of a particular position, scores resulting from test situations, evaluations and assessments, and grades. Criticisms and ideas concerning these specific measures will be presented when and as these criticisms appear in the literature.

A. On-the-job records

1. Data on measures relating to production:

- a. Quantity, e.g., net sales, number of calls per day, units completed, etc. (4, 9, 10, 11, 14, 34, 45, 50, 68, 70, 73, 84, 86, 90, 92, 94)
 - 1) The units of work should be comparable for all, or this factor should be corrected statistically, (45) Data should be collected under uniform conditions (84, 92, 103) over an extended period so that an average is obtained. (10)
- b. Quality, e.g., errors, breakage, spoilage, etc. (9, 10, 11, 45, 50, 68, 70, 86, 94)
 - 1) The suggestion has been made the best measure results where all errors above an allowable minimum are automatically detected by objective inspection, as with an electric eye mechanism. (103)
- c. Quantity adjusted for quality (11, 45, 90, 102) e.g., evaluate time, material or cost involved in the imperfect or spoiled product. (45)
- d. Percent efficiency, i.e., percent ratio of earned hours to clock hours (earned hours means the time set by company for completing a unit of work, on the basis of rational analysis, experience from speed of work on similar tasks, time required by pace setters, time and motion analyses; and clock hours means the time actually required by the worker.) (45, 90)

2. Accident data. (9, 11, 68, 70, 102)

- a. Criticism: Data on causes are inadequate; accidents are often due to factors beyond the control of the individual. (66)

3. Absenteeism (102)

4. Measures related to training, e.g., time required to train employee; (9, 10, 11, 45, 68, 86, 102, 103) cost of training, or material used during training. (9, 102)

- a. Criticism:

- 1) It is difficult to equate opportunity to learn. (103)
- 2) Relevance to ultimate success is questionable (86)

5. Measures related to tenure.

- a. Retention on the job. (4, 9, 10, 11, 45, 68, 70, 92, 111, 102, 103)

- b. Frequency of job changes. (93, 95)

- c. Promotions (102) and rate of advancement. (9, 10, 61, 68)

- 1) Criticism.

- (a) These measures are dependent on business conditions (79)

- (b) Reasons for leaving are vague, contradictory, hard to obtain. (87, 92)

- (c) Tenure data is only available for post left. (93)

6. Composite over-all value to the company:

e.g., "The Dollar criterion"- a job analysis is accomplished to reveal the variables and the manner and extent to which the products and behavior affect the efficiency of the organization.

When the cost accounting evaluations of the criterion elements and the best estimations as to individual differences are available, the importance of each criterion element can then be estimated as the product

of these two figures.

As the weight by which the number of units produced is multiplied this equals the value of the production for that work unit. The value of all the work units involved in the job can then be added directly to obtain an overall composite.

7. Measures related to income

a. Types

1) Salary. (11, 40, 61, 68, 101, 103)

a) Average for a specified period (69)

b) Salary corrected for age (85)

2) Commissions and bonuses. (9, 10, 11, 68, 70, 73)

3) Gross Earnings. (25, 73)

4) Income after a certain number of years. (109)

b. Criticism: Wage increases are rarely given on the basis of merit (103); and are dependent on the type of work, and union regulations. (93)

B. Status or Achievement of a Particular Position.

1. Grade, rank, job level (101) e.g., the Civil Service Grade or Armed Service rank. (85)

2. Achievement of a certain leadership position, e.g., captain of a team (61) executive position. (85)

3. Membership in professional societies. (9, 10, 11, 68)

4. Trade status. (journeyman vs. apprentice) (9, 10, 11, 68)

5. Alive-or-dead - Military Criterion. (86)

6. Results of administrative action, e.g., graduation or non-graduation or eliminations from school. (101)

C. Scores resulting from Test Situations. (95)

1. Types of Test Situations.

- a. Tests of knowledge and information: e.g., written or oral Standardized achievement tests. (9, 10, 11, 68, 70, 95, 101, 103)

1) Criticism:

- a) The tests usually cover only a part of the job. (23)
- b) The relationship of the test to performance has been questioned (101)
- c) The verbal element on the test may be a biasing factor (19).

- b. Performance Tests, job or work sample (11, 45, 50, 75, 90, 110, 119, 120, 121) e.g., the standard flight in Air Force (110, 119, 120, 121)

- 1) The use of devices for measuring and recording results has been suggested e.g., photographic, graphic, sound recorders (50, 101, 119, 120, 121) e.g. interaction chronograph can record time element in a situation (24, 85). Criticism: These devices have the limitations of being costly and time consuming (120).

D. Evaluations and Assessments.

1. Factors that are evaluated or assessed.

- a. Product. (35, 94)
- b. Performance. (34)
- c. Degree of responsibility. (9, 10, 11, 68, 69, 101)
- d. Social interaction.

- 1) Influence on fellow workers (103)
- 2) Attitudes. (28)
- e. Reactions to discipline and regulations. (28)
- f. Job Satisfaction. (28, 40, 50, 68, 82, 86, 91, 93, 101, 106, 109)
- g. Personal happiness. (40, 109)
2. Individuals who evaluate.
 - a. Superiors. (28, 45, 61, 79, 85, 92, 103)
 - b. Associates (equals, buddies). (125)
 - 1) Advantages: Usually many are available. Associates are better able to assess aspects such as leadership, personality, and general social interaction. (125)
 - c. Subordinates. (28)
 - d. Self, (usually evaluations of such things as job satisfaction, adjustment etc.) (28, 40, 50, 68, 82, 86, 91, 103, 106, 108)
 - e. Others: Family, friends. (28)
 - f. Combinations of the above.
 - 1) Use of ratings by all, each of whom view the individual in a different light. (75)
 - 2) Use of self ratings, and evaluations by others to check each other. (122)
3. Techniques of evaluation and assessment.
 - a. Ratings (graphics, man-to-man, descriptive, check list, linear etc.)

1) Advantages attributed to ratings. (63, 75)

- a) They are analytic
- b) They can be explicit and unambiguous and can be recorded, studied and interpreted.
- c) They are uniform and standardized, comparable, and summarizable.
- d) They are quantitative, therefore amenable to statistical analysis, and correction for biases, etc.
- e) They can be given periodically and systematically.
- f) They are easy to use.
- g) They represent the best method of objectifying human judgments, particularly of less tangible, but important variables.
- h) They enable one to obtain an appraisal of the total performance in all its essential elements.

2) Recommendations for improvements of rating.

- a) Use of factor analysis of the rating form has been suggested. (13, 14)
- b) Use of "critical incident technique" to get job requirements has been suggested. Description: Critical requirements of a job or activity are established through direct observations by participants in or supervisors of the activity. A critical requirement is crucial in that it has been responsible for outstandingly effective or definitely unsatisfactory performance of an important part of the job. Critical

requirements are collected. These are sorted into groups of similar behavior (content analysis) from which the rating scale is made. (38, 39, 127, 129). Criticism: they suffer from the usual problems of rating scales. Also no validity studies are available. (129)

- c) The scale should be adopted for the specific purpose and situation. (62)
 - d) The scale should be adopted for use by non experts. (62)
 - e) The addition of new adjectives to the scale, or more points may improve them. (39)
 - f) The mixing up of scales - forcing the rater to study each one has been suggested. (39)
 - g) Frequency charts, showing how many ratings of each type are expected should be used. Scores, should be corrected by converting them to standard scores having the same distribution of frequencies. (39)
 - h) The use of more raters has been suggested. (39)
 - i) The use of a forced choice technique has been suggested. (39)
 - j) The classification and recording of observations should improve ratings. (39)
 - k) The use of the unweighted average of impartial judges has been recommended. (11)
- b. Rankings: Order-of-merit. (6, 55, 95, 97, 111)
- 1) A suggested method: (12) Separate total group into sub-groups. Rank within the sub-group. Merge sub-group by

modified paired comparison.

2) Advantages attributed to rankings:

- a) The method has face validity. (6)
- b) The method is reasonably stable. (6)
- c) Rankings are reasonably uncontaminated with regard to the selection variables. (6)
- d) The method is easily understood. (12)
- e) Raters like and have confidence in the procedures. (12)
- f) The suggested method above can be applied to large groups. (12)
- g) The method required little of the raters time. (12)

c. Nominations: Sociometric techniques. (28, 112)

1) Suggested methods.

- a) Nominations of people with whom the individual would like to work (58, 85) e.g., fly wing on in combat (85, 113) and reasons for nominations. (112)
- b) Nominations of best and worst workers. (61, 85, 86, 125)
- c) Statement of whether individual likes, dislikes or is indifferent to every other worker. (58)
- d) Nomination of an individual for a leadership position. (61)

2) Advantages attributed to nominations

- a) Nominations are more reliable than graphic ratings. (126)

b) They are more predictable than academic grade.

(126)

c) They are especially useful in identifying leaders.

(58, 112)

d) They are useful as measures of attitude of

workers towards each other, and towards management.

4. Criticisms of these techniques

a) Difficulties exist in using rating scales e.g.

unwillingness of raters to rate. (75, 101)

b) They lack between observer reliability. (39,

70, 116)

c) They lack validity (39), due to distortions,

prejudices, biases, and misunderstandings as

what is being judged. (28, 75, 93)

d) Difficulties exist in the interpretation of

ratings due to differences in standards between

raters, (39, 92) lack of standards of comparison

between jobs (93), failure to obtain spread

of scores. (29)

e) There is an absence of definable units to form

a continuous scale of judgment. (28)

f) Difficulties in weighting exist. (28)

E. Grades. (50, 74, 85, 90, 95, 107, 109, 115)

Grades are usually a composite of many things; mainly a combination of evaluations and test scores. "A hodge-podge of many characteristics of the individual, the instructor, the course, and the situation." (107)

1. Types: Specific course grades or summary grades in public

schools, training schools, corporation schools.

2. Criticism:

- a. They suffer from the lack of objectivity similar to evaluations and assessments. (55, 75, 107)
- b. Relevance to ultimate job success has been questioned (44, 60, 93, 96, 101, 115)

IV Personnel

- A Program Coordinator : H E Brogden
- B. Project Director : " "
- C. Research Associate : E R Stunkel

BIBLIOGRAPHY: IV SPECIFIC MEASURES SUGGESTED FOR USE AS CRITERIA

4. Baier, D. E. Criterion reliability in the selection of recruiting personnel. *Amer. Psychol.*, 1948, 3, 290-291, A.
6. Bechtoldt, H. P., Maucker, J. W. and Stuit, D. B. The use of order of merit rankings, in Kelly, G. A. New Methods in applied psychology. U. of Maryland, 1947, 26-33.
9. Bingham, Walter V. D. Aptitudes and aptitude testing. New York Harpers, 1937.
10. Bingham, Walter D. Measures of occupational success. *Harvard Business Review* 5, 1926, 1-18
11. Bingham, Walter V. D. and Freyd, M. Procedures in employment psychology. Chicago, A. W. Shaw, 1936, 30-48.
12. Bittner, Reign. Rating criterion. Criterion Symposium, Denver APA Convention, 1949.
13. Bolanovich, D. J. Statistical analysis of an industrial rating chart. *J. Appl. Psychol.*, 1946, 30, 23-31.
14. Bolanovich, D. J. Statistical problems of worker evaluation. *Personnel*, 1946, 23, 210-218.
15. Brogden, H. E. On the interpretation of the correlation coefficient as a measure of predictive efficiency. *J. Educ. Psychol.*, 1946, 37, 65-76.
16. Brogden, H. E. Panel on research in selection and combination of criteria. Personnel Research Section, Criterion Symposium, 1949.
18. Brogden, H. E. and Taylor, E. K. The dollar criterion - applying the cost accounting concept to criterion construction. *Person. Psychol.*, 1950, 3, 133-154.
19. Brogden, H. E. and Taylor E. K. Theory and classification of criterion bias. *Educ. and Psychol. Measurement*, 1, 1950, 10, 159-186.
24. Chapple, E. C., and Donald, G. Method for evaluating supervisory personnel; inter-action chronograph. *Harv. Bus. Rev.*, 1946, 14, 73.
25. Clerk, Harold F. Life earning as a criterion, in Hoppech. *Criteria of Vocational Success, A Symposium, Occupations*, 1936, 14, 73.
28. Davies, J. G. W. What is occupational success? *Occupational Psychol. (Eng.)* 1, 1950, 7-17.
34. Farmer, E. The reliability of the criteria used for assessing the value of vocational tests. *Brit. J. Psychol.*, 1948, 25, 389-399.
38. Flanagan, J. C. Critical requirements: A new approach to employee evaluation. *Person. Psychol.*, 1947, 2, 419-427.
39. Flanagan, J. C. Ratings as criteria. PRS Symposium, op. cit.

40. Froelich, Clifford. Toward more adequate criteria of counseling effectiveness. *Educ. and Psychol. Measur't.*, 1949, 3, 255-268.
44. Gaylord, R. H. and Russell, E. West Point evaluative measures in the prediction of officer efficiency. Unpublished.
45. Ghiselli, E. and Brown, C. Personnel and industrial psychology. McGraw Hill, 1948.
50. Horst, Paul. Prediction of personal adjustment. Social Science Research Council, 1941, Chapt. 3 and 7.
55. Hull, Clark L. Attitude testing. New York World Book Co., 1928.
58. Jacobs, J. H. The application of sociometry to industry. *Sociometry*, 1945, 8, 181-198.
60. Jenkins, J. G. Validity for what? *J. Consult Psychol.*, 1946, 10, 93-98.
61. Jenkins, W. O. A review of leadership studies with particular reference to military problems. *Psychol. Bull.*, 1947, 44, 54-79.
62. Kingsbury, Forrest A. Making rating scales work. *J. Pers. Res.*, 4, 1925, 1-6.
63. Kornhouser, A. W. What are rating scales good for? *J. Pers. Res.*, 5, 1926, 189-193.
66. Lauer, A. R. Concerning the establishment of a criterion and certain incidental points relating to validity coefficients. *Proc. Iowa Acad. Sci.*, 54, 1938, 259-262.
68. Link, Henry C. Limiting the problem, in Hoppock. 933, op. cit.
69. Lorge, Irving. Criteria for guidance, in Hoppock. 958, op. cit.
70. Mandell, Milton M. Facts and fallacies in personnel testing. *Personnel*, 1947 24, 112-115.
73. Otis, Jay L. Job analysis and performance as related to the criterion. *PRS Symposium*, op. cit.
74. Page, D. P. Measurement and prediction of leadership. *Amer. J. Sociol.*, 1935, 41, 31-43.
75. Patterson, C. H. On the problem of the criterion in prediction studies. *J. Consult. Psychol.*, 1946, 10, 277-280.
79. Pond, Millicent. Success of the factory worker, in Hoppock. 940, op. cit.
82. Rammers, H. H. Measuring attitude toward the job, in Hoppock. 945, op. cit.
84. Rundquist. Production records. *PRS Symposium*, 1949, op. cit.
85. Shimberg, Benjamin. Criteria used in the evaluation and selection of leaders.

1948, Unpublished.

86. Sisson, E. D. The criterion in Army personnel research, in Kelly. op. cit.
87. Smith, C. A. The correspondence between the internal and the external criterion in item selection. Brit. J. Educ. Psychol., 1943, 3, 163, A.
90. Stead, W. H. and Shartle, C. L. Occupational counseling techniques. 1940.
91. Stott, Mary B. Criterion used in England, in Hoppoch. 953.
92. Stott, Mary B. Occupational success. Occup. Psychol., London, 1939, 13, 126-140.
93. Stott, Mary B. The appraisal of vocational guidance. Occup. Psychol., 1943, 17, 6-16.
94. Stuit, D. B. The effect of the nature of the criterion upon the validity of aptitude tests. Educ. Psychol. Measm't., 1947, 7, 671-676.
95. Stuit, D. B. Personnel research and test development in the Bureau of Naval Personnel, Princeton. 1947, 357-379.
96. Stuit, D. B. and Wilson, J. T. Effect of an increasingly well defined criterion on the prediction of success at naval training school. J. Appl. Psychol., 1946, 30, 614-623.
97. Taylor, E. K. What raters rate? Amer. Psychol., 1948, 3, 289, A.
101. Thorndike, Robt. L. Personnel Selection test and measurement techniques. N. Y. John Wiley and Sons, 1949, 119-159.
102. Tiffin, Joseph. Industrial psychology. Prentice Hall, 1947.
103. Toops, H. A. The criterion. Educ. Psychol. Measm't., 1944, 4, 271-297.
104. Toops, H. and Kuder, G. F. Test construction and statistical interpretation. Rev. Educ. Res., 1935, 5, 229-241.
107. Toops, H. and Kuder, G. F. Measures of aptitude. Rev. Educ. Res., 1935, 5, 215.
108. Travers, Robert M. W. Use of a discriminant function in the treatment of psychological group differences. Psychometrika, 1939, 4, 25-32.
109. Travers, Robert M. A critical review of techniques for evaluating guidance. Educ. and Psychol. Measm't., 1949, 211-235.
110. Tucker, A. C. Objective measurement of flying skill, in Kelly. op. cit.
111. VanDusen, A. C. Importance of criteria in selection and training. Educ. Psychol. Measm't., 1947, 7, 498-504.
112. VanDusen, A. C. Method for establishing leadership criteria. Amer. Psychol.,

113. Vaughn, C. L. The nominating technique, in Kelly. 23-26, op, cit.
115. Vernon, Philip E. and Parry, John B. Personnel selection in the British forces. U. of London, 1949.
116. Viteles, M. S. Standards of accomplishment: criteria of vocational selection. J. Person. Res., 4, 1936, 10, 483-486.
119. Viteles, M. S. Industrial implications of wartime developments in psychology. J. of Consult. Psychol., 1946, 10, 85-92.
120. Viteles, Morris S. and Thompson, Albert S. An analysis of photographic records of aircraft pilot performance. Section A. A study of criteria of pilot proficiency derived from motion photographs of flight performance. CAA Report No. 31, 1944.
121. Viteles, Morris S. and Thompson, Albert S. Use of standard flights and motion photography in the analyses of aircraft pilot performance. CAA Report No. 15, 1943.
122. Ward, L. B. Criteria of crew proficiency in operational training, in Kelly. op. cit.
125. Wherry, R. J. Panel on research on selection and combination of criteria. PRS Symposium, 1949, op, cit.
126. Wherry, R. J. and Fryer, D. H. Buddy ratings: popularity contest or leadership criteria? Person. Psychol., 2, 147-160.
127. Wilkes, S. S. Weighting systems for linear functions of correlated variables when there is no dependent variable. Psychometrika, 1938, 3, 23-40.
129. Army air force aviation psychology program. Research Report No. 3: Research Problems and Techniques, 1947.

TED
8